Microgravity, Demonstrations, STEM, and your Classroom

BLANK FORCE FORMS

SEEC 2011

February 3-5, 2011

Space Center Houston

Houston, Texas

Richard DeLombard
Mr. Microgravity, Ltd.
Huron, Ohio

Dennis P. Stocker
NASA Glenn Research Center
Cleveland, Ohio

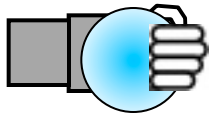
BLANK SHEETS FOR FORCE ANALYSIS

Analyze the situation for each device and develop the forces involved. Don't forget that gravity pulls down on EVERYTHING.

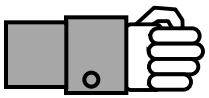
Can you explain the observed motion by the forces?

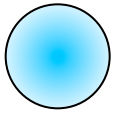
Foam Ball or Foam Rocket Launcher

HOLD

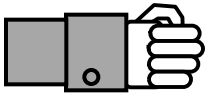


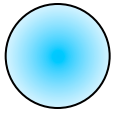
DROP





THROW

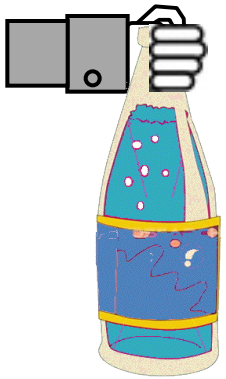




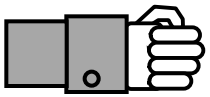
WHAT FORCES ARE ON THE BALL? (neglect air resistance)

Leaky water bottle

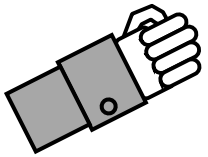
HOLD



DROP



TOSS



WHAT FORCES ARE THERE ON THE WATER?
WHAT DOES THE WATER DO?

Astronaut in a bottle

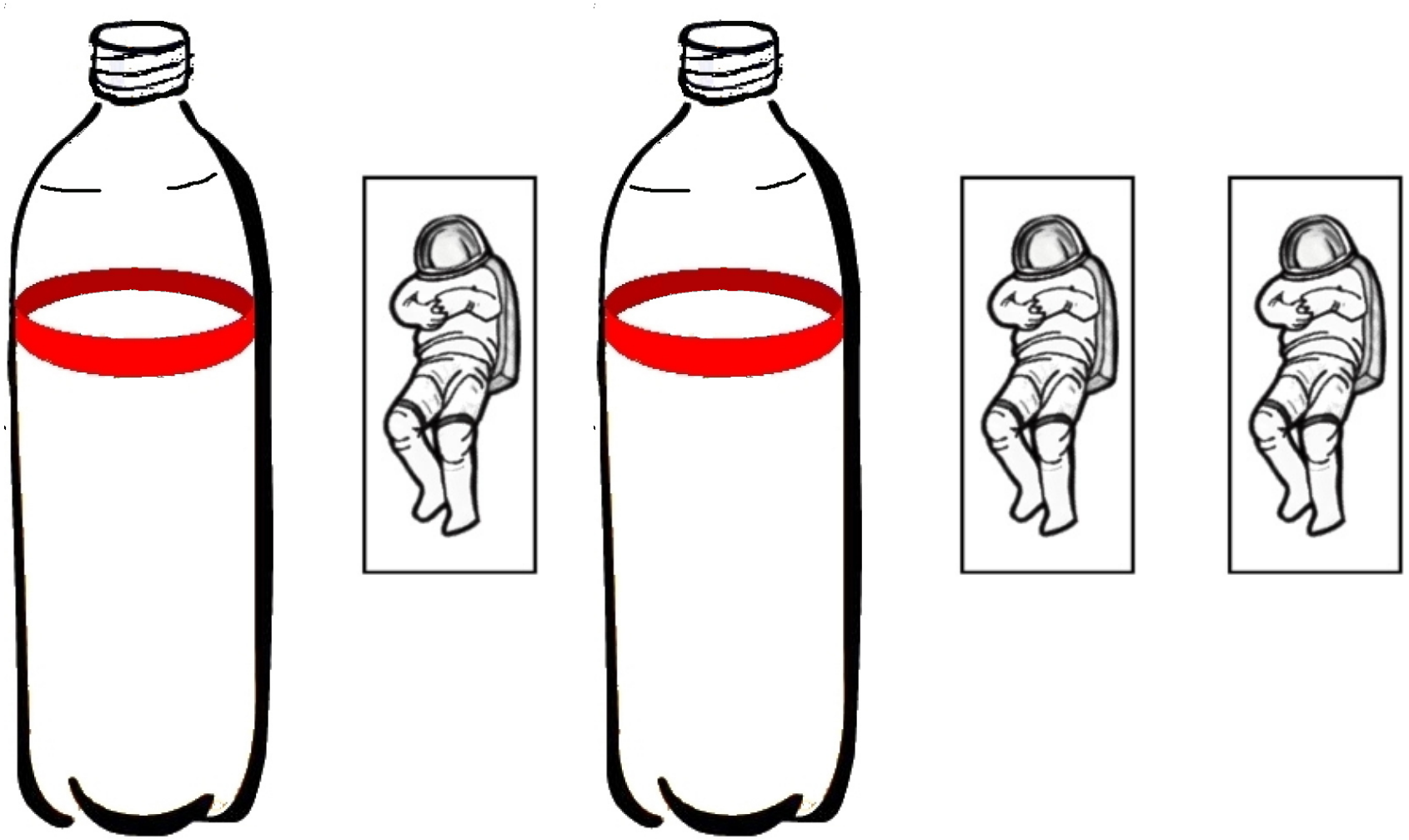
HOLD

RELEASE ONLY STRING

RELEASE STRING & BOTTLE

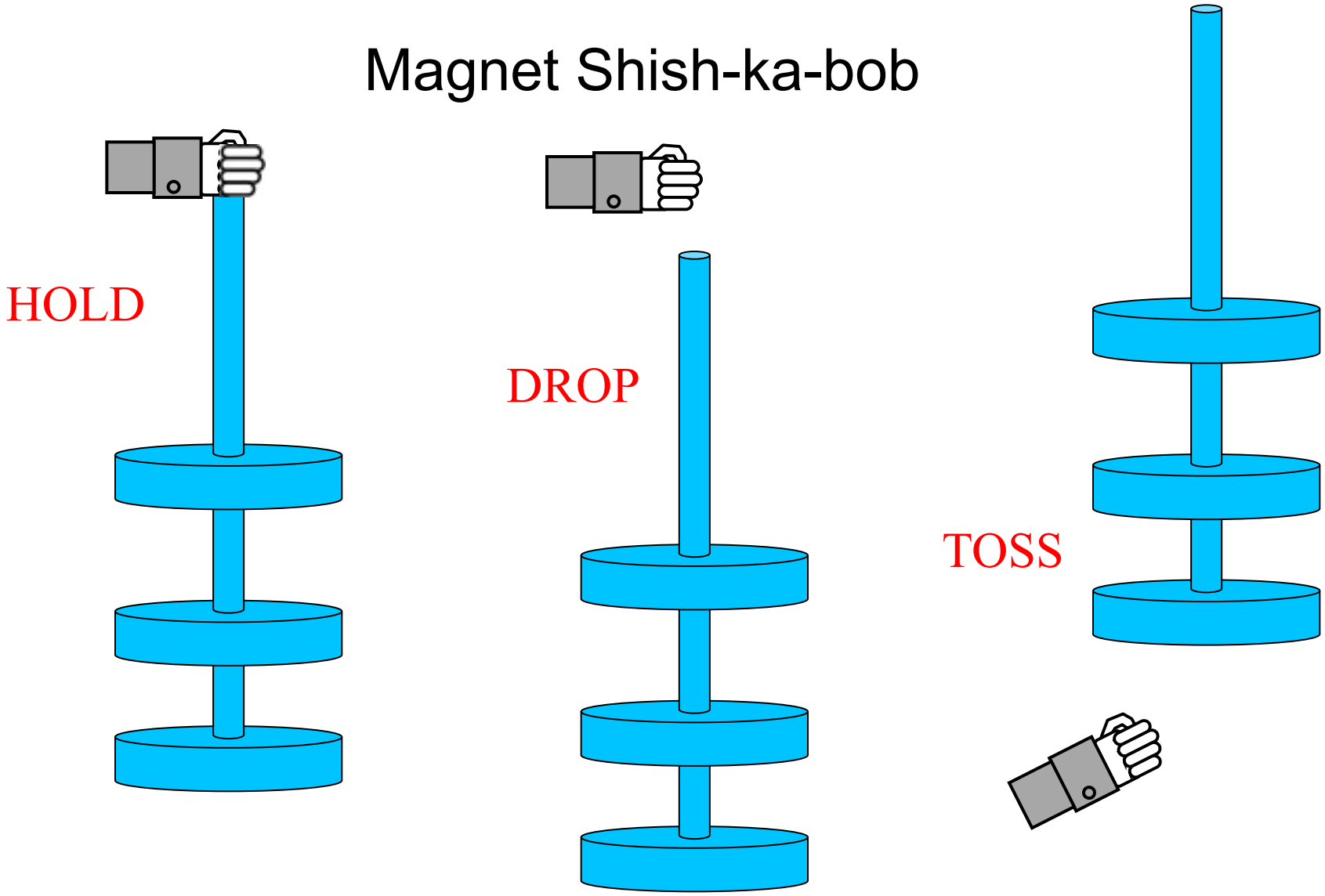
WHAT FORCES ARE ON THE BOTTLE? AND ON THE ASTRONAUT?
WHAT FALLS? WHY? WHAT DOES THE ASTRONAUT DO INSIDE?

Astronaut in a bottle



More diagrams to draw the astronaut's location and forces involved at different times.

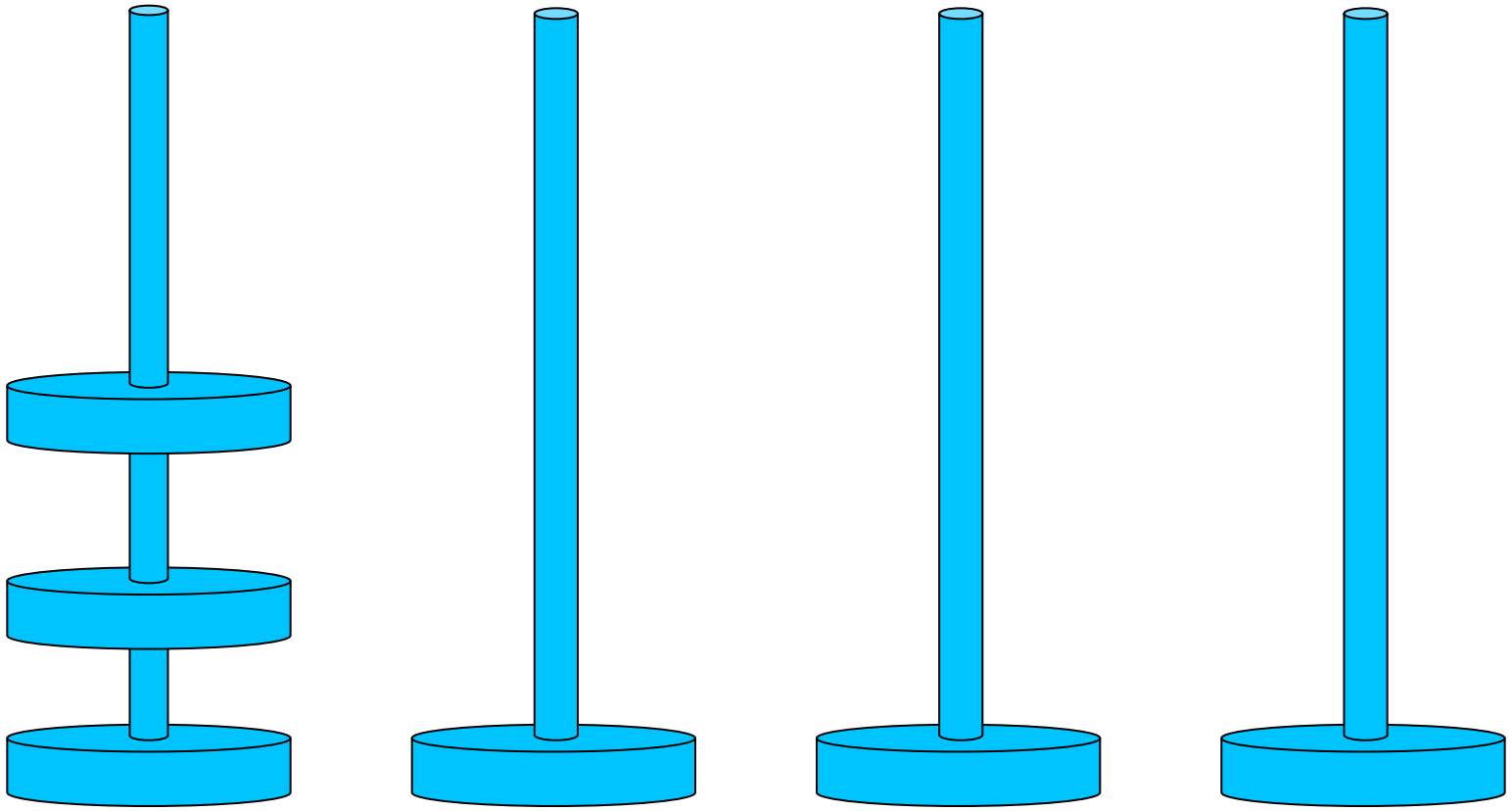
Magnet Shish-ka-bob



Large version to show the internal forces.

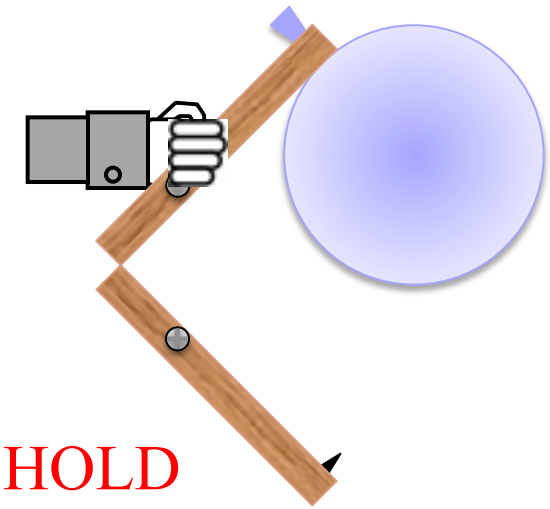
WHAT FORCES ARE INVOLVED? (Neglect stick mass.)
WHAT DO THE MAGNETS DO? WHY?

Magnet Shish-ka-bob

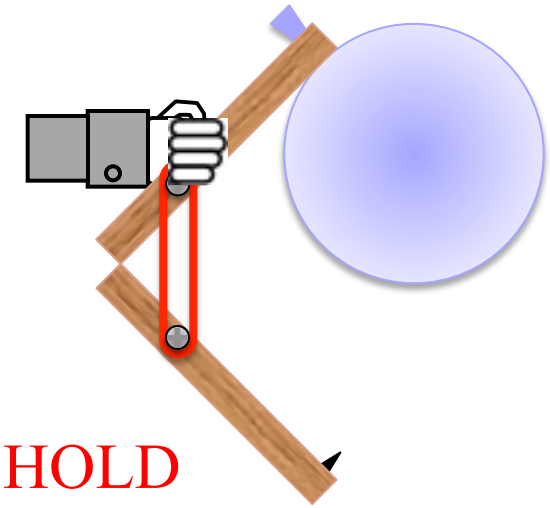


More diagrams to draw where the magnets are and the forces at different times (i.e. held, dropped, or tossed). (Neglect stick mass.)

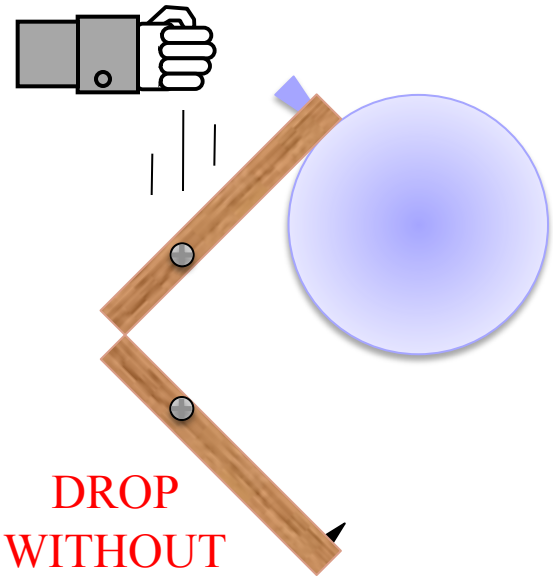
Balloon popper



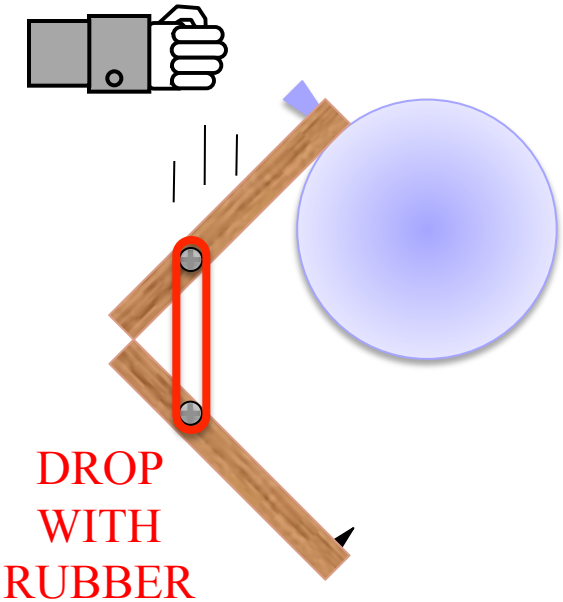
HOLD
w/o rubber band



HOLD
with rubber band



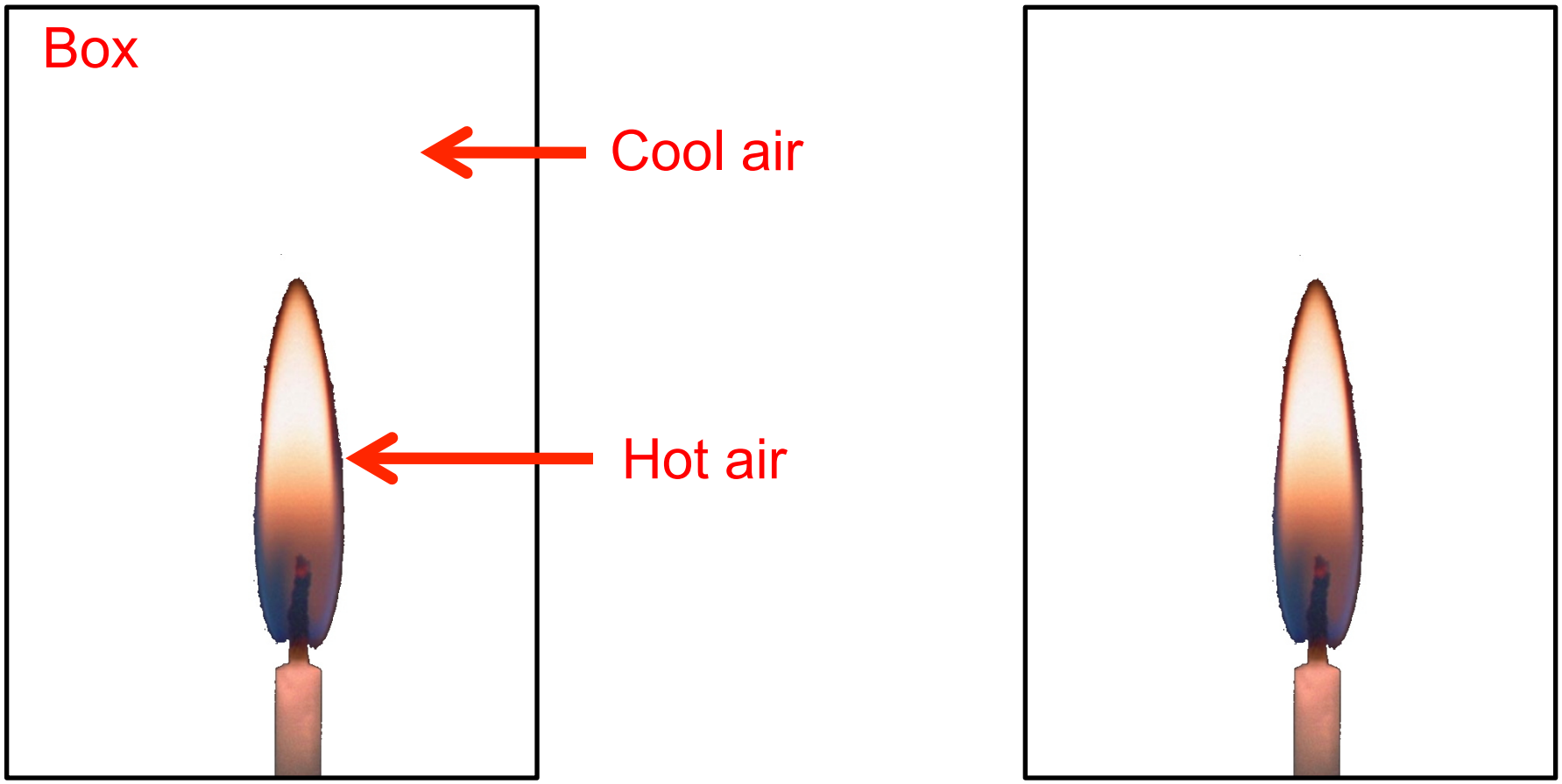
DROP
WITHOUT
RUBBER
BAND



DROP
WITH
RUBBER
BAND

WHAT FORCES ARE INVOLVED? (Neglect balloon mass.)
HOW DO THE ARMS MOVE? WHY?

Candle flames in 1 g and on Shuttle

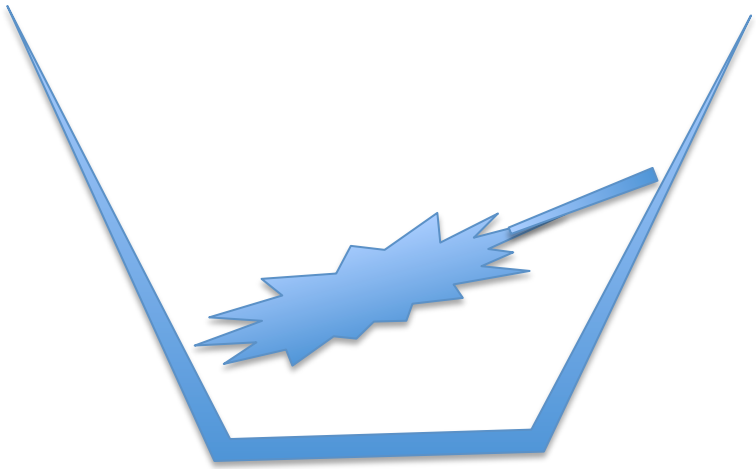


What forces are acting on the air and the flame when the box is held and when it is dropped?

Feather and Cup

FEATHER

CUP



What forces are acting on the feather when it is falling by itself and when it is in the cup when it is dropped?